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Weed Management Guide 1988

FOR COMMERCIAL VEGETABLE GROWERS

The University of Illinois and its agents assume no responsibility for results from the use of herbicides, whether or not they were used in accordance with suggestions, recommendations, or directions of the manufacturer or any governmental agency.

Weeds pose one of the most important threats to the income of vegetable growers in the United States, causing millions of dollars in losses as a result of lower yields, poorer quality, and reduced efficiency. Herbicides are only part of a complete weed control program that should include mechanical control, mulches, crop rotation, and herbicides as needed. As you decide which weed control methods and which labeled herbicides to use, take into account past weed infestations, the present crop, planned future crop rotations, soil types, and pesticide prices.

In some instances, a weed control program may include only mechanical control, but in other instances, herbicides will be required to supplement mechanical control. Use a cultivator or a sharp hoe to cut weeds off while breaking up the soil crust. Do not till too deeply, or shallow-rooted crops may be injured and a fresh supply of weed seeds may germinate.

Plastic mulches, besides controlling weeds, will conserve moisture and increase the soil temperature, which can improve early season crop growth. Only herbicides labeled for the crop should be used between rows of mulch. Care should be used if a herbicide is applied under the mulch because crop injury can occur. Treflan, Prowl, Sonalan, and other herbicides that volatilize should not be applied under mulches or row covers.

Crop rotation should also be considered an integral part of vegetable-crop weed control. By rotating fields among different families of crops (for example, between muskmelon and soybeans), problems with diseases, insects, or weeds can sometimes be avoided. A wider spectrum of herbicides is generally available for use in agronomic crops, so weed problems that cannot be controlled in vegetable crops may be controlled in agronomic crops. You should scout your area to determine the existing weed problems, and if these weeds are difficult to control in planned future crops, you should consider other crops.

Several herbicides are often labeled for a crop. The choice of which of these herbicides to use is yours. Scouting your area to determine which weeds are present will allow you to select the herbicide that will give you the best results. Tank mixes can be used to give broader spectrum control. Check the labels for the specific tank mixes that are allowed.

All the herbicides labeled for a given crop are not necessarily listed below. Also, because revisions may change some herbicide uses, always read and follow carefully the directions on a current herbicide label before using any product. If you are unfamiliar with a herbicide, conduct a small evaluation under your environmental conditions and cultural practices before using the herbicide extensively.

Always Read and Understand the Herbicide Label Before Using the Product

Reading the herbicide label carefully is the most profitable use of your time spent in weed control. Information on the label will direct you to the correct uses, application methods, and rates. Following label directions will result in the best possible control with minimal crop injury. The label contains restrictions on use and discusses environmental and soil conditions

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that affect crop injury and influence the effectiveness of weed control. *Do not use any herbicide unless the label states that it is cleared for your particular use and crop.*

The label also states whether the herbicide is a restricted-use or general-use pesticide. Restricted-use pesticide labels contain a statement that the products are restricted, and that only licensed applicators can buy them and supervise their application. At present the only restricted-use herbicides labeled for vegetable crops are Bladex and Gramoxone. Any person who uses a restricted-use herbicide must be licensed as a private or commercial applicator by the Illinois Department of Agriculture. Consult your county Extension adviser for information about this program.

The information in this circular is current as of the date of publication. Watch for notices of changes in the EPA registration of herbicides in the *Illinois Vegetable Farmer's Letter* or the *Insect, Weed, and Plant Disease Survey Bulletin*. Contact your county Extension adviser or Vegetable Crops Extension, University of Illinois, 1103 W. Dorner Drive, Urbana, Illinois 61801, for subscription information.

Growers with Several Vegetable Crops

Growers with several vegetable crops in a small area should consider using a low-percentage granular herbicide. *Check the herbicide label closely for rates and application techniques. Application must be uniform and accurate or crop injury can occur.* Consult Table 1 for a herbicide that can be used on your crop. Be sure to follow the label directions that pertain to each crop on which the herbicide will be applied.

Stale Seedbed Treatment

Roundup, dalapon, or Gramoxone can be applied outside the normal growing season to control emerged weeds. Weeds should be growing actively and the application must be made before the crop has emerged. If you are applying Roundup to control perennial weeds, it is recommended that Roundup be applied before working the soil. Once Roundup has been applied, it must be allowed to translocate throughout the perennial weed for several days or incomplete control may result. Follow Roundup label directions carefully for the rates and timing of application. If perennial weeds are not a major problem, you can eliminate early flushes of weeds by preparing the soil 10 to 14 days before planting and then applying Roundup, dalapon, or Gramoxone to all weeds that emerge. Plant the crop with minimal reworking of the soil. Never apply Roundup or Gramoxone to an emerged crop because severe crop injury or death will occur.

Roundup and Gramoxone will control most annual broadleaf and grass weeds. Neither herbicide has any soil residual activity, so other weed control measures will be necessary during the growing season. Gramoxone will also suppress perennials by killing their shoots, but it should not be expected to control regrowth of perennial weeds from rhizomes or other underground storage organs. Roundup is better for controlling perennials, because it will kill shoots and translocate to destroy underground parts. Roundup will only suppress some particularly hard-to-control perennials such as bindweed, hemp dogbane, and milkweed. To obtain control of these perennials, applications of high rates or repeat applications of glyphosate (within label guidelines), or mechanical removal may be necessary.

How to Use This Circular

There are four tables in this circular. First, use Table 1 to determine the herbicides that are labeled for use in your crop. If you are not certain of the herbicide name, both the common name and the trade names of all herbicides in this circular are listed in Table 4. Once you have determined which herbicides are available and the weeds present, use Table 2 to determine which of the labeled herbicides will provide the best control. Then consult Table 3 for restrictions, precautions, and other considerations that may limit your use of a particular herbicide. These tables are not intended to replace careful reading of a current herbicide label. **ALWAYS READ THE LABEL BEFORE APPLYING ANY PESTICIDE.**

Table 1. Herbicides Labeled for Use in Vegetable Crops

	Aatrex, others (atrazine)	Alanap (naptalam)	Amiben (chloramben)	Balan (benefin)	Basagran (bentazon)	Bladex (cyanazine)	Brominal (bromoxynil)	Chem Hoe (propham)	2,4-D amine	Dacthal (DCPA)	Dalapon 85, others (dalapon)	Devrinol (napropamide)	Dual (metolachlor)	Enide (diphenamid)	Eptam, Genep (EPTC)	Eradicane Extra (EPTC + safener + extender)	Furloe (chlorpropham)	Fusilade 2000 (fluazifop-butyl)	Genate Plus, Sutan + (butylate plus safener)	Goal (oxyfluorfen)	Gramoxone (paraquat)	Karmex, others (diuron)	Kerb (pronamide)	Lasso (alachlor)	Lexone, Sencor (metribuzin)	Linex, Lorox (linuron)	Poast (sethoxydim)	Prefar (bensulide)	Princep, others (simazine)	Prowl (pendimethalin)	Pyramin (pyrazon)	Ramrod (propachlor)	Randox (CDAA)	Rhonox, others (MCPA)	Ro-Neet (cycloate)	Roundup (glyphosate)	Sinbar (terbacil)	Sonalan (ethalfluralin)	Surpass (vernolate)	Surflan (oryzalin)	Thistrol (MCPB)	Tillam (pebulate)	Treflan (trifluralin)
Asparagus			X						X		X	X						X			X	X		X		X		X						X	X						X
Broccoli										X		X									X													X							X
Cabbage										X		X									X												X	X							X
Carrot																	X	X			X					X								X							X
Cauliflower										X		X									X													X							X
Collard										X											X													X							X
Cucumber		X	X							X											X						X														X
Dry Beans			X		X					X			X		X																			X		X				X
Eggplant										X		X									X																			
Greens										X											X														X						X
Horseradish										X																									X						
Lettuce				X				X													X		X					X							X						
Lima Bean			X		X					X			X				X							X											X		X				X
Muskmelon		X	X							X											X							X													
Okra														X																					X						X
Onion							X			X							X			X	X													X						
Peas					X			X			X		X								X									X		X		X		X				X	X
Pepper			X							X		X		X							X																			X
Popcorn	X				X				X				X			X			X					X		X			X						X			X			
Potato										X	X		X	X	X						X				X				X						X				X		X
Pumpkin			X																		X							X			X									
Snap Beans			X		X					X	X		X		X						X														X						X
Squash			X							X											X							X													
Sweet Corn	X				X	X			X				X			X			X					X					X	X		X			X			X			
Table Beet																														X				X	X						
Tomato			X							X		X		X							X				X			X													X	X
Turnip										X		X									X														X						X
Watermelon		X								X											X							X	X												

Table 2. Weed Susceptibility to Herbicides Labeled for Use in Vegetable Crops

Herbicide	Weeds controlled	
	Grasses	Broadleaves
AAtrex, others (atrazine)	barnyardgrass, foxtail, crabgrass	cocklebur, jimsonweed, lambsquarters, mustard, annual morningglory, nightshade, pigweed, purslane, ragweed, velvetleaf
Alanap (naptalam)		carpetweed, chickweed, cocklebur, hairy galinsoga, lambsquarters, purslane, ragweed
Amiben (chloramben)	barnyardgrass, foxtail, crabgrass, goosegrass, seedling johnsongrass, wild proso millet	carpetweed, chickweed, lambsquarters, mustard, nightshade, pigweed, purslane, ragweed, smartweed, velvetleaf
Balan (benefin)	annual bluegrass, barnyardgrass, crabgrass, fall panicum, foxtail, goosegrass, seedling johnsongrass	carpetweed, chickweed, knotweed, lambsquarters, pigweed, purslane

Table 2. Weed Susceptibility to Herbicides Labeled for Use in Vegetable Crops (continued)

Herbicide	Weeds controlled	
	Grasses	Broadleaves
Basagran (bentazon)		Canada thistle, purslane, lambsquarters, ragweed, galinsoga, jimsonweed, smartweed, velvetleaf, wild mustard, cocklebur
Bladex (cyanazine)	annual bluegrass, barnyardgrass, crabgrass, fall panicum, foxtail, goosegrass, witchgrass	carpetweed, cocklebur, chickweed, purslane, morningglory, jimsonweed, lambsquarters, nightshade, pigweed, ragweed, velvetleaf, wild mustard
Brominal (bromoxynil)		mustard, cocklebur, pennycress, jimsonweed, annual morningglory, nightshade, lambsquarters, smartweed, pigweed
Chem Hoe (propham)	annual bluegrass, downy brome, volunteer small grains	common chickweed, stinging nettle
2,4-D amine		carpetweed, dandelion, dock, galinsoga, pigweed, jimsonweed, lambsquarters, morningglory, plantain, ragweed, smartweed, thistle, wild mustard
Dacthal (DCPA)	crabgrass, foxtail, barnyardgrass, goosegrass, annual bluegrass, seedling johnsongrass	carpetweed, lambsquarters, common chickweed, purslane
Dalapon 85 or Dowpon M (dalapon)	barnyardgrass, foxtail, bluegrass, bermudagrass, crabgrass, johnsongrass, quackgrass, witchgrass	
Devrinol (napropamide)	barnyardgrass, weedy brome, crabgrass, foxtail, goosegrass, seedling johnsongrass	chickweed, purslane, common groundsel, prostrate knotweed, lambsquarters, pigweed, prickly lettuce
Dual (metolachlor)	barnyardgrass, crabgrass, fall panicum, foxtail, goosegrass, witchgrass	nightshade, carpetweed, galinsoga, pigweed
Enide (diphenamid)	annual bluegrass, crabgrass, barnyardgrass, fall panicum, foxtail, goosegrass, seedling johnsongrass	carpetweed, chickweed, groundsel, knotweed, lambsquarters, pigweed, purslane, smartweed
Eptam or Genep (EPTC)	annual bluegrass, crabgrass, barnyardgrass, foxtail, goosegrass, shattercane, witchgrass	annual morningglory, carpetweed, chickweed, lambsquarters, nightshade, purslane
Eradicane Extra (EPTC + safener + extender)	annual bluegrass, crabgrass, barnyardgrass, goosegrass, seedling johnsongrass, volunteer small grains, foxtail	annual morningglory, nightshade, carpetweed, lambsquarters, purslane, pigweed, velvetleaf
Furloe (chlorpropham)	annual bluegrass, witchgrass	black nightshade, carpetweed, knotweed, curled dock (seedling), purslane, smartweed, shepherdspurse, mustard
Fusilade 2000 (fluazifop-butyl)	bermudagrass, goosegrass, johnsongrass, wild proso millet, barnyardgrass, fall panicum, foxtail, crabgrass, witchgrass, volunteer cereals	
Genate Plus or Sutan+ (butylate + safener)	barnyardgrass, crabgrass, fall panicum, foxtail, goosegrass, shattercane, seedling johnsongrass	
Goal (oxyfluorfen)		eveningprimrose, pigweed, common groundsel, purslane, black nightshade, shepherdspurse
Gramoxone (paraquat)	Most annual grasses and broadleaves. See stale seedbed discussion.	
Karmex, others (diuron)	barnyardgrass, crabgrass, annual bluegrass, foxtail	pigweed, purslane, ragweed, chickweed, mustard, pennycress, velvetleaf
Kerb (pronamide)	barnyardgrass, brome, annual bluegrass, panicum, foxtail, goosegrass, volunteer small grains	carpetweed, chickweed, henbit, knotweed, purslane, lambsquarters, nightshade, morningglory
Lasso (alachlor)	barnyardgrass, crabgrass, foxtail, goosegrass, fall panicum, witchgrass	carpetweed, pigweed, galinsoga, nightshade, purslane
Lexone or Sencor (metribuzin)	downy brome, crabgrass, foxtail, seedling johnsongrass	pigweed, purslane, ragweed, chickweed, jimsonweed, lambsquarters, pepperweed, shepherdspurse, smartweed, prickly sida
Linex or Lorox (linuron)	barnyardgrass, crabgrass, fall panicum, goosegrass	annual morningglory, carpetweed, groundsel, lambsquarters, mustard, cocklebur, pigweed, prickly sida, purslane, smartweed, velvetleaf

Table 2. Weed Susceptibility to Herbicides Labeled for Use in Vegetable Crops (continued)

Herbicide	Weeds controlled	
	Grasses	Broadleaves
Poast (sethoxydim)	bermudagrass, goosegrass, johnsongrass, quackgrass, wild proso millet, barnyardgrass, fall panicum, foxtail, crabgrass, witchgrass, volunteer cereals	
Prefar (bensulide)	crabgrass, foxtail, fall panicum, goosegrass	
Princep, others (simazine)	annual bluegrass, crabgrass, foxtail, goosegrass, fall panicum, witchgrass	carpetweed, galinsoga, nightshade, pigweed, purslane
Prowl (pendimethalin)	barnyardgrass, crabgrass, fall panicum, foxtail	carpetweed, lambsquarters, pigweed, purslane
Pyramin (pyrazon)		lambsquarters, pigweed, ragweed, shepherdspurse, purslane, nightshade, mustard, henbit, smartweed
Ramrod (propachlor)	barnyardgrass, crabgrass, foxtail, goosegrass, fall panicum	carpetweed, pigweed, purslane
Randox (CDAA)	annual bluegrass, crabgrass, barnyardgrass, foxtail	carpetweed, pigweed, purslane
Rhonox, Weedone MCPA, others (MCPA)		lambsquarters, wild mustard, ragweed, yellow rocket, purslane, pepperweed, cocklebur, Canada thistle, dandelion, shepherdspurse
Ro-Neet (cycloate)	annual bluegrass, crabgrass, volunteer barley, foxtail, barnyardgrass	nightshade, henbit, lambsquarters, purslane, redroot pigweed, shepherdspurse
Roundup (glyphosate)	Most annual and perennial grasses and broadleaves. See discussion of stale seedbed treatment.	
Sinbar (terbacil)	crabgrass, foxtail, seedling johnsongrass, barnyardgrass, annual bluegrass	chickweed, lambsquarters, wild mustard, pepperweed, shepherdspurse, dandelion, knotweed, pigweed, purslane, plantain, ragweed, henbit, jimsonweed
Sonalan (ethalfluralin)	annual bluegrass, crabgrass, barnyardgrass, foxtail, goosegrass, fall panicum, seedling johnsongrass, shattercane, witchgrass	wild buckwheat, carpetweed, chickweed, lambsquarters, pigweed, nightshade, purslane
Surpass (vernolate)	barnyardgrass, crabgrass, foxtail, goosegrass, wild proso millet	annual morningglory, purslane, lambsquarters, pigweed, velvetleaf, carpetweed
Surflan (oryzalin)	barnyardgrass, crabgrass, penicum, foxtail, seedling johnsongrass	carpetweed, lambsquarters, pigweed, purslane, prostrate spurge
Thistrol (MCPB)		Canada thistle, lambsquarters, pigweed, smartweed, sowthistle, annual morningglory
Tillam (pebulate)	barnyardgrass, crabgrass, foxtail, goosegrass	lambsquarters, pigweed, purslane, shepherdspurse
Treflan (trifluralin)	annual bluegrass, crabgrass, barnyardgrass, foxtail, seedling johnsongrass, goosegrass	carpetweed, chickweed, knotweed, lambsquarters, pigweed, purslane

HERBICIDE RATES AND GUIDELINES FOR USE IN VEGETABLE CROPS

All herbicide rates given in Table 3 are in the amount of product per broadcast acre. You should adjust amounts accordingly for banded applications. Preemergence applications should be made before weeds emerge or after any weeds are removed. Postemergence applications should be made after weeds have emerged. Stale seedbed treatments should be made only if weeds have emerged but no crop plants are present.

Table 3. Herbicide Rates and Guidelines for Use in Vegetable Crops

Herbicide	Rate of product per broadcast acre	Remarks
	ASPARAGUS	
Preemergence		
Amiben (chloramben)	6 qt of 2S or 30 lb of 10G, or 3.6 lb of 75DS	Seedling asparagus only. Irrigate after application.
Devrinol (napropamide)	4-6 lb of 50WP	Rainfall or irrigation is necessary for activity. Established beds only.
Karmex, others (diuron)	2-4 lb of 80WP	Do not apply to young plants during the first year. Two applications per year can be made. See label restrictions.
Lexone or Sencor (metribuzin)	1.3-2.5 lb of 75DF	Established beds only.
Princep, others (simazine)	2-4 lb of 80WP	Established beds only.
Sinbar (terbacil)	1.5-3 lb of 80WP	With direct seeded asparagus, spray activated carbon over rows. High organic soils inactivate Sinbar.
Treflan (trifluralin)	1-1.5 pt of 4EC, or 2-4 pt of MTF	See label for incorporation instructions. Established beds only.
Postemergence		
2,4-D amine	See label	Apply to actively growing weeds.
Dalapon 85 or Dowpon M (dalapon)	10-20 lb	Spot treatment or direct spray under fern growth.
Fusilade 2000 (fluazifopbutyl)	16-48 fl oz of 1EC	NONBEARING ASPARAGUS ONLY. Use crop oil concentrate or a nonionic surfactant. See label for amount.
Poast (sethoxydim)	1.5-2 pt of 1.5EC	NONBEARING ASPARAGUS ONLY. Use crop oil concentrate or a nonionic surfactant. See label for amount.
Stale Seedbed		
Gramoxone (paraquat)	1 qt	See discussion of stale seedbed treatment.
Roundup (glyphosate)	1.5-3 qt	See discussion of stale seedbed treatment. Apply at least 1 week before spears emerge, or delay until after harvest.
	CARROT	
Preemergence		
Furloe (chlorpropham)	6 qt of 4EC	Apply in 20 gal or more of water per acre.
Treflan (trifluralin)	1-2 pt of 4EC or MTF	Must be incorporated.
Postemergence		
Fusilade (fluazifopbutyl)	1-1.5 pt of 1EC	Use crop oil concentrate or nonionic surfactant. Up to 2 applications can be made per year.
Linex or Lorox (linuron)	2 lb of 50WP	Carrots must be at least 3 inches tall. Apply before grasses are 2 inches tall.
Stale Seedbed		
Gramoxone (paraquat)	1 qt	See discussion of stale seedbed treatment.
Roundup (glyphosate)	1.5-3 qt	See discussion of stale seedbed treatment.

Table 3. Herbicide Rates and Guidelines for Use in Vegetable Crops (continued)

Herbicide	Rate of product per broadcast acre	Remarks
	COLE CROPS (Broccoli, Brussels Sprout, Cabbage, Cauliflower, and Turnip)	
Preemergence		
Dacthal (DCPA)	8-11 lb of 75WP	Not effective on high organic soils. Can be sprayed directly over transplants.
Devrinol (napropamide)	2-4 lb of 50WP	Can apply to transplants or direct-seeded plants. Should incorporate shallowly.
Randox (CDAA)	4-6 qt of 4EC	For use on cabbage only.
Treflan (trifluralin)	1-2 pt of 4EC or MTF	Direct-seeded cole crops exhibit marginal tolerance to Treflan. Stunting can occur under stress. Must be incorporated.
Stale Seedbed		
Gramoxone (paraquat)	1 qt	See discussion of stale seedbed treatment.
Roundup (glyphosate)	1.5-3 qt	See discussion of stale seedbed treatment.
	CORN (Sweet and Popcorn)	
Preemergence		
AAtrex, others (atrazine)	2-4 lb of 80WP, or 4-6 pt of 4L, or 2.2-3.3 lb of Nine-O	Land treated with atrazine should not be planted with any vegetable the next year or injury may occur.
Bladex (cyanazine)	1.5-6.0 lb of 80WP, or 1.3-5.3 lb of 90DF, or 1.25-4.75 qt of 4L	Land treated with Bladex should not be planted with any vegetable the next year or injury may occur.
Dual (metolachlor)	1-3 pt of 8EC	Can be applied to the surface before planting or incorporated.
Eradicane Extra (EPTC + safener + extender)	4-8 pt of 6.7EC	Will suppress wild proso millet. Must be incorporated. Contains an extender that may lengthen the period of control.
Genate Plus or Sutan + (butylate)	4.75-7.33 pt of 6.7EC	Especially useful on sandy soils. Must be incorporated.
Lasso (alachlor)	2-4 qt of 4EC	
Princep, others (simazine)	3.75-5 lb of 80WP, or 6-8 pt of 4L	Do not plant vegetables the year after application. Do not graze treated area.
Prowl (pendimethalin)	1.5-4 pt of 4EC	Do not incorporate. For use on processing varieties. Do not apply prior to planting.
Ramrod (propachlor)	6-9 lb of 65WP, or 4-6 qt of 4L	Not cleared for popcorn.
Surpass (vernolate)	4-7 pt of 6.7EC	Do not use if soil contains more than 10% organic matter. Incorporate.
Postemergence		
AAtrex, others (atrazine)	4-6 pt of 4L, or 2.5-3.75 lb of 80WP, or 2.2-3.3 lb of Nine-O	Can be applied with crop oils. Preemergence applications preferred. See label precautions.
Basagran (bentazon)	1.5-2 pt of 4S	Apply when weeds are small. Consult label for specific directions.
2,4-D amine	See label	Apply to actively growing weeds, preferably before corn is 6 inches tall. See label restrictions.
Stale Seedbed		
Roundup (glyphosate)	1.5-3 qt	See discussion of stale seedbed treatment.

Table 3. Herbicide Rates and Guidelines for Use in Vegetable Crops (continued)

Herbicide	Rate of product per broadcast acre	Remarks
	CUCURBITS (Cucumber, Muskmelon, and Watermelon)	
Preemergence		
Alanap (naptalam)	6-8 qt of 2L	A second application can be made prior to vining. Normally tank mixed with Prefar.
Amiben (chloramben)	6 qt of 2S, or 3.6 lb of 75DS	Use only with seed protected with activated carbon. Do not use on watermelon. Follow label directions carefully.
Dacthal (DCPA)	6-14 lb of 75WP	Apply when the crop is at the 4-5 true leaf stage. For use on direct-seeded cucurbits only.
Prefar (bensulide)	5-6 qt of 4EC	Incorporate or irrigate in. Can tank mix with Alanap. Do not plant other than label-specified crops for 18 months after application.
Stale Seedbed		
Gramoxone (paraquat)	1 qt	See discussion of stale seedbed treatment.
	DRY BEANS (White, Navy, Kidney, Pinto, Lima, and Adzuki)	
Preemergence		
Amiben (chloramben)	2.4-3.6 lb of 75DS or, 20-30 lb of 10G	
Dacthal (DCPA)	8-11 lb of 75WP	
Dual (metolachlor)	1.5-3 pt of 8EC	
Eptam or Genep (EPTC)	2.5-3.5 pt of 7EC	Do not use on adzuki beans, cowpeas, lima beans, or other flat pod beans. Incorporate immediately.
Furloe (chlorpropham)	4 qt of 4EC	Lima beans only. Seed must be planted at least 1 inch deep.
Lasso (alachlor)	2.5-3 qt of 4EC	Only for lima beans and red kidney beans. May delay maturity of red kidney beans in cool, wet weather.
Sonalon (ethalfloralin)	1.5-3 pt of 3EC	Must be incorporated.
Treflan (trifluralin)	1-2 pt of 4EC or MTF	Must be incorporated.
Postemergence		
Basagran (bentazon)	1.5-2 pt of 4S	Apply when weeds are small. Beans are tolerant after the first trifoliate leaf has expanded.
Stale Seedbed		
Roundup (glyphosate)	1.5-3 qt	See discussion of stale seedbed treatment.
	EGGPLANT	
Dacthal (DCPA)	6-14 lb of 75WP	Apply 4-6 weeks after transplanting or when direct-seeded plants are 4-6 inches tall. Cultivate if weeds have emerged before applying.
Devrinol (napropamide)	2-4 lb of 50WP	Transplanted eggplant only.
Stale Seedbed		
Gramoxone (paraquat)	1 qt	See discussion of stale seedbed treatment.

Table 3. Herbicide Rates and Guidelines for Use in Vegetable Crops (continued)

Herbicide	Rate of product per broadcast acre	Remarks
	GREENS (Chicory, Collard, Kale, Mustard, Spinach, Turnip Greens)	
Preemergence		
Dacthal (DCPA)	6-14 lb of 75WP	For use on collards, kale, and mustard and turnip greens. Not effective on high organic matter soils.
Furloe (chlorpropham)	1-2 qt of 4EC	Spinach only. Use lower rates in cool, wet weather.
Treflan (trifluralin)	1-1.5 pt of 4EC or MTF	Must be incorporated.
Stale Seedbed		
Gramoxone (paraquat)	1 qt	Collards only. See discussion of stale seedbed treatments.
Roundup (glyphosate)	1.5-3 qt	See discussion of stale seedbed treatment.
	HORSERADISH	
Preemergence		
Dacthal (DCPA)	6-14 lb of 75WP	Apply uniformly to soil at planting time.
Stale Seedbed		
Roundup (glyphosate)	1.5-3 qt	See discussion of stale seedbed treatment.
	LETTUCE	
Preemergence		
Balan (benefin)	3-4 qt of 1.5EC	Direct-seeded lettuce only. Must be incorporated.
Chem Hoe (propham)	3.75-6 qt of 4L	Rainfall or irrigation is required within a few days after application.
Kerb (pronamide)	2-4 lb of 50WP	Moisture is necessary to activate. Label rates vary depending on variety.
Prefar (bensulide)	5-6 qt of 4EC	Can be applied to head and leaf lettuce. Must be incorporated.
Postemergence		
Chem Hoe (propham)	3.75-6 qt of 4L	Apply when lettuce has 4 or more leaves. Irrigate to move herbicide into the root zone.
Stale Seedbed		
Gramoxone (paraquat)	1 qt	See discussion of stale seedbed treatment.
Roundup (glyphosate)	1.5-3 qt	See discussion of stale seedbed treatment.
	OKRA	
Preemergence		
Enide (diphenamid)	3.3 lb of 90WP	Apply at planting.
Treflan (trifluralin)	1-2 pt of 4EC or MTF	Must be incorporated immediately after application.
Stale Seedbed		
Roundup (glyphosate)	1.5-3 qt	See discussion of stale seedbed treatment.

Table 3. Herbicide Rates and Guidelines for Use in Vegetable Crops (continued)

Herbicide	Rate of product per broadcast acre	Remarks
	ONION	
Preemergence		
Dacthal (DCPA)	6-14 lb of 75WP	Can be applied at planting or at layby. Emerged weeds will not be controlled.
Furloe (chlorpropham)	4-8 qt of 4EC, or 30-40 lb of 20G	Do not use on sandy soils. Use lower rate in cool, wet weather. Seeded onions only.
Postemergence		
Brominal (bromoxynil)	0.5-0.75 pt of 4ME	Apply when onions have 2-5 true leaves. Sensitivity of onions is affected by variety and environment.
Furloe (chlorpropham)	4-8 qt of 4EC, or 30-40 lb of 20G	Apply after onions are 6 inches tall and have 3 true leaves. Apply as a directed spray. Do not use on sandy soils.
Goal (oxyfluorfen)	0.6 pt of 2EC	Do not apply until onions have 2 true leaves. Best control achieved when weeds are in the 2-4 leaf stage.
Stale Seedbed		
Gramoxone (paraquat)	1 qt	See discussion of stale seedbed treatment.
Roundup (glyphosate)	1.5-3 qt	See discussion of stale seedbed treatment.
	PEAS	
Preemergence		
Chem Hoe (propham)	4 qt of 4L, or 27 lb of 15G	Incorporate after application.
Dual (metolachlor)	1.5-3 pt of 8EC or 6-12 lb of 25G	Can be incorporated. See label for restrictions.
Ramrod (propachlor)	6-7.5 lb of 65WP	Do not use on sandy soils. For green processing peas only.
Treflan (trifluralin)	1-1.5 pt of 4EC or MTF	Must be incorporated. Can tank mix with Surflan. May suppress root rot.
Postemergence		
Basagran (bentazon)	1.5-2 qt of 4S	Apply when weeds are small. Pea injury can occur. See label precautions.
Rhonox, Weedone MCPA, others (MCPA)	See label	Treat when weeds are 4-6 inches tall. Peas may be injured.
Dalapon 85 or Dowpon M (dalapon)	1 lb	Apply when peas are 3-6 inches tall and weeds are small. See label restrictions.
Thistrol (MCPB)	2-6 pt of 2EC	Apply when peas have developed 6-12 nodes and weeds are less than 3 inches tall.
Stale Seedbed		
Gramoxone (paraquat)	1 qt	See discussion of stale seedbed treatment.
Roundup (glyphosate)	1.5-3 qt	See discussion of stale seedbed treatment.
	PEPPER	
Preemergence		
Amiben (chloramben)	30-40 lb of 10G	Apply to established peppers when foliage is dry.
Dacthal (DCPA)	6-14 lb of 75WP	Apply 4-6 weeks after transplanting or when direct-seeded plants are 4-6 inches tall.
Devrinol (napropamide)	2-4 lb of 50WP	Can be applied to direct-seeded plants or transplants. Incorporate.
Enide (diphenamid)	3.3 lb of 90WP	May be applied to direct-seeded plants or transplants.

Table 3. Herbicide Rates and Guidelines for Use in Vegetable Crops (continued)

Herbicide	Rate of product per broadcast acre	Remarks
Treflan (trifluralin)	1-2 pt of 4EC or MTF	Incorporate. Apply to transplants only.
Stale Seedbed		
Gramoxone (paraquat)	1 qt	See discussion of stale seedbed treatment.
POTATO		
Preemergence		
Dacthal (DCPA)	6-14 lb of 75WP	Apply at planting, drag off, or at layby.
Dual (metolachlor)	1.5-3 pt of 8EC	Apply preemerge, incorporated, or at layby. Do not use on muck soils.
Enide (diphenamid)	4.4 lb of 90WP	Hilling or other treatment which brings untreated soil to surface will reduce effectiveness.
Eptam or Genep (EPTC)	3.5-7 pt of 7EC	Incorporate immediately after applying. The variety Superior is sensitive.
Lexone or Sencor (metribuzin)	0.6-1.33 lb of 75DF	Make a single application prior to emergence.
Linex or Lorox (linuron)	1.5-2.5 pt of 4L, or 1-4 lb of 50WP or 50DF	Apply after planting but before potato emergence. Plant "seed" 2 inches deep.
Prowl (pendimethalin)	1.5-3 pt of 4EC	Incorporate lightly. Do not use on muck soils.
Surflan (oryzalin)	1.33 lb of 75WP, or 0.75-1 qt of 4AS	Use on white-skinned varieties only. Do not use on soils with more than 5% organic matter.
Treflan (trifluralin)	1-2 pt or 4EC or MTF	Apply after planting and incorporate uniformly.
Postemergence		
Lexone or Sencor (metribuzin)	0.5-1 pt of 4L, or 0.3-0.67 lb of 75DF	Do not use on smooth-skinned white- or red-skinned potatoes. Apply only if 3 successive days of sun have occurred prior to application. Apply before weeds are 1 inch tall.
Stale Seedbed		
Dalapon 85 or Dowpon M (dalapon)	3-10 lb	See discussion of stale seedbed treatment. Apply before potatoes emerge and when grass is small. Do not apply when planting red skin varieties or White Rose.
Gramoxone (paraquat)	1 qt	See discussion of stale seedbed treatment.
Roundup (glyphosate)	1.5-3 qt	See discussion of stale seedbed treatment.
PUMPKIN AND SQUASH		
Preemergence		
Amiben (chloramben)	1.5-2 gal of 2S, or 30-40 lb of 10G, or 3.6-4.8 lb of 75DS	Weed control can be erratic on soils with less than 1% organic matter. Can be broadcast or banded. Apply to seeded squash or pumpkins only.
Dacthal (DCPA)	6-14 lb of 75WP	Not effective on soils with greater than 5% organic matter. Use on summer and winter squash only. Apply when plants are well established and have 4-5 leaves.
Prefar (bensulide)	5-6 qt of 4EC	Incorporate or irrigate in. See label restrictions.
Ramrod (propachlor)	4-6 qt of 4L	USE ON PROCESSING PUMPKINS ONLY. Do not apply to jack-o-lantern types. Do not apply to sandy soils.
Stale Seedbed		
Gramoxone (paraquat)	1 qt	See discussion of stale seedbed treatment.

Table 3. Herbicide Rates and Guidelines for Use in Vegetable Crops (continued)

Herbicide	Rate of product per broadcast acre	Remarks
	SNAP BEANS OR GREEN BEANS	
Preemergence		
Amiben (chloramben)	4-5 qt of 2S, or 2.4-3 lb of 75DS	
Dacthal (DCPA)	6-14 lb of 75WP	Not effective on soils with more than 5% organic matter. Do not feed treated plants to livestock.
Dual (metolachlor)	1.25-2.5 pt of 8EC	
Eptam or Genep (EPTC)	3.5 pt of 7EC	Do not use on flat-podded beans. Must be incorporated.
Treflan (trifluralin)	1-1.5 pt of 4EC or MTF	Must be incorporated.
Postemergence		
Basagran (bentazon)	1.5-2 pt of 4S	Apply when weeds are small. Beans are tolerant after the first trifoliate has fully expanded. Some injury to beans may occur.
Stale Seedbed		
Dalapon 85 or Dowpon M (dalapon)	8 lb	See discussion of stale seedbed treatment. Wait 4-5 weeks before planting.
Gramoxone (paraquat)	1 qt	See discussion of stale seedbed treatment.
Roundup (glyphosate)	1.5-3 qt	See discussion of stale seedbed treatment.
	TABLE BEET	
Preemergence		
Pyramin (pyrazon)	3-3.5 qt of 4.2FL	Rainfall or irrigation is needed for activation.
Ro-Neet (cycloate)	2-2.7 qt of 6EC	Must be incorporated. Use on mineral soils only.
Postemergence		
Pyramin (pyrazon)	3.5 qt of 4.2FL	Timing is very important. Treat when beets have 2 expanded leaves and weeds have 2-4 leaves.
Stale Seedbed		
Roundup (glyphosate)	1.5-3 qt	See discussion of stale seedbed treatment.
	TOMATO	
Preemergence		
Amiben (chloramben)	2.4-3.6 lb of 75DS, or 4-6 qt of 2S, or 30-40 lb of 10G	Direct-seeded plants must be protected by activated charcoal. Or apply when tomatoes are established.
Dacthal (DCPA)	6-14 lb of 75WP	Apply when direct-seeded plants are established and 4-6 inches tall or when transplanted plants have been established for 4-6 weeks.
Devrinol (napropamide)	2-4 lb of 50WP	Must be incorporated.
Enide (diphenamid)	4.4 lb of 90WP	Incorporate or irrigate in. Can be applied over the top of transplants.
Lexone or Sencor (metribuzin)	0.5-1 pt of 4L, or 0.33-0.66 lb of 75DF	Apply to transplanted tomatoes only. May be incorporated.
Prefar (bensulide)	4-5 qt of 4EC	Incorporate or irrigate in. Do not plant other than specified crops for 18 months after treatment.
Tillam (pebulate)	2.66-4 qt of 6EC	Do not use Tillam with row covers.

Table 3. Herbicide Rates and Guidelines for Use in Vegetable Crops (continued)

Herbicide	Rate of product per broadcast acre	Remarks
Treflan (trifluralin)	1-2 pt. of 4EC or MTF	Must be incorporated. For direct-seeded plants apply at blocking or thinning as a directed spray between rows.
Postemergence		
Lexone or Sencor (metribuzin)	0.5-0.75 pt of 4L, or 0.33-0.67 lb of 75DF	Plants must be established; see label. Apply only if 3 successive days of sun have occurred prior to application.
Stale Seedbed		
Gramoxone (paraquat)	1 qt	See discussion of stale seedbed treatment.

Table 4. Common and Corresponding Trade Names that Appear in This Circular

Common name	Trade name
alachlor	Lasso
atrazine	AAtrex, others
benefin	Balan
bensulide	Prefar
bentazon	Basagran
bromoxynil	Brominal
butylate + safener	Genate Plus, Sutan +
CDAA	Randox
chloramben	Amiben
chlorpropham	Furloe
cycloate	Ro-Neet
cyanazine	Bladex
2,4-D amine	several names
dalapon	Dalapon 85, Dowpon M
DCPA	Dacthal
diphenamid	Enide
diuron	Karmex, others
ethalfluralin	Sonalan
EPTC	Eptam, Genep
EPTC + safener + extender	Eradicane Extra
fluazifop-butyl	Fusilade 2000
glyphosate	Roundup
linuron	Linex, Lorox
MCPA	Rhonox, Weedone MCPA, others
MCPB	Thistrol
metolachlor	Dual
metribuzin	Lexone, Sencor
napropamide	Devrinol
naptalam	Alanap
oryzalin	Surflan
oxyfluorfen	Goal
paraquat	Gramoxone
pebulate	Tillam
pendimethalin	Prowl
pronamide	Kerb
propachlor	Ramrod
propham	Chem Hoe
pyrazon	Pyramin
sethoxydim	Poast
simazine	Princep, others
terbacil	Sinbar
trifluralin	Treflan
vernolate	Surpass

Herbicide Drift

Certain herbicides, if not used correctly, can cause injury to nontarget plants. Herbicides such as Command, dicamba, and 2,4-D can drift up to a mile and cause serious damage to grapes, tomatoes, peppers, other vegetables, fruit trees, and ornamental plants. Before spraying Command, dicamba, or 2,4-D, survey the area for desirable plants. Spray only on calm days and use drift inhibitors when appropriate. Minimize drift by applying herbicides with nozzles that produce large droplets. Use an amine formulation of 2,4-D to reduce vapor drift. Spray Command, dicamba, and 2,4-D when the temperature is expected to be lower than 80-85°F for several days after treatment. Avoid applying Command to wet soils.

Spray Tank Residuals

Carefully follow label directions for cleaning spray equipment after using dicamba or 2,4-D. If possible, do not use the same spray equipment to apply 2,4-D or dicamba that you use to apply other pesticides.

Storing Pesticides

Keep pesticides in a separate area, room, or building used only for storage purposes. The storage area should be dry and ventilated. Keep all entrances to the area locked at all times to protect children, other people, and animals. **Caution:** Do not store herbicides together with insecticides. Remove only the pesticide that will be used in one day, and after use return the pesticide to the storage area. Do not allow Amiben Liquid, Basagran, Blazer, Gramoxone, Lasso EC, Lorox L, or Ramrod to freeze.

Disposing of Pesticides and Containers

Surplus pesticides. If possible use surplus pesticide mixtures by applying them to labeled crops or areas

that have the same pest. Never drain surplus pesticides in any location where they can contaminate ground or surface water supplies. Avoid creating surplus tank mixes by accurately measuring the treatment area and mixing the correct amount of pesticide. If a large amount of surplus pesticide is generated, contact the Illinois EPA Division of Land Pollution Control to locate a nearby landfill that has a supplemental permit for toxic waste or to obtain other instructions about disposal.

Pesticide containers. All empty containers, regardless of their type, should be rinsed three times before disposal. Rinse water should be dumped in the tank. Triple-rinsed containers should be punctured or broken to facilitate drainage and to prevent reuse for any purpose. Containers should then be hauled to a sanitary landfill for disposal. Private applicators can bury containers singly in open fields, with regard for the protection of surface and subsurface water. However, commercial applicators must dispose of containers in an approved landfill.

Illinois regulations permit the burning of combustible containers provided that they are burned on the premises where they were used, that they are burned at least 1000 feet from residential areas, that the burning will not cause undue visibility or environmental hazards, and that no reasonable alternative disposal method exists. Local and county regulations must also be observed; check before burning to determine that burning is permitted in your area.

Do not breathe smoke from burning pesticide containers, and do not burn containers used for 2,4-D or other herbicides whose vapors may damage nearby plants.

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